

Notice of Allowability

Application No.

10/790,680

Examiner

Henry S. Hu

Applicant(s)

WU ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment of August 4, 2006.
2. ☒ The allowed claim(s) is/are 18-30 and 33.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with **Amy E.L. Schoenhard (registration # 46,512, tel: 202 857-6000) on September 29, 2006** to cancel both non-elected Claims 31-32 as following:

Claim

Claims 31 and 32 please cancel Claim 31 and Claim 32

DETAILED ACTION

2. This Office Action is in response to **Amendment** filed on August 4, 2006. With such an amendment, **Claims 18, 27-28 and 31-33 were amended**, while no claim was cancelled or added. To be more specific, two parent **Claims 18 and 33** were rewritten to limit the purification of thermoprocessable tetrafluoroethylene (TFE) copolymers being **in gel form** so as

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to respond to Examiner's statement on page 8 of non-final action as well as to overcome **ODP claim rejection** over **US Patent No. 6,790,932 B2 to Kapeliouchko et al.** (also see page 10 of Remarks); while the informalities in **Claims 17 and 27-28** as raised by Examiner were also corrected. Examiner thereby withdraws ODP claim rejections and claim objections in the previous Non-Final Office Action dated May 18, 2006.

With the above examiner's amendment, non-elected claims including **Claims 31 and 32** (Group II, which is related to a compound) were cancelled. **Claims 18-30 and 33** with two independent claims (**Claim 18 and Claim 33**) are now pending. An action follows.

3. Claim rejections under **Non-Final** Office Action filed on May 18, 2006 are now removed for the reasons given in paragraphs 4-11 thereafter.

Allowable Subject Matter

4. Claims 18-30 and 33 are allowed.

5. The following is an examiner's statement of reasons for allowance: The above Claims 18-30 and 33 are allowed over the closest references:

6. The limitation of parent **Claim 18** in present invention relates to **thermoprocessable tetrafluoroethylene (TFE) copolymers in gel form** obtained by two steps:

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(A) adding an acid electrolyte having pH ≤ 2 to a polymer latex, produced by polymerization in dispersion or aqueous emulsion of TFE with one or more monomers selected from the following: (a) C_{3-8} perfluoroolefins; (b) C_{2-8} hydrogenated fluoroolefins; (c) C_{2-8} chloro- and/or iodo-fluoroolefins; (d) (per)fluoroalkylvinylethers (PAVE) $CF_2=CF-O-R_f$; (e) (per)fluoro-oxyalkylvinylethers $CF_2=CF-O-X$; (f) fluorodioxoles; (g) non-conjugated dienes of $CF_2=CF-O-CF_2CF_2-CF=CF_2$ or $CFX^1=CX^2-O-CX^3CX^4-O-CX^2=CX^1F$; and (h) fluorovinylethers (MOVE) having a formula of $CFX_{Al}=CX_{Al}-O-CF_2-O-R_{Al}$;

(B) washing the polymeric gel with acid aqueous solutions or neutral aqueous solutions; wherein all factors in the above monomers are as specified; and wherein the copolymers are purified through washing the polymer gel as specified so as to contain an amount of extractable cations lower than 1 ppm and an amount of surfactant lower than 10 ppm. See other limitations of dependent **Claims 19-30**.

Other parent **Claim 33** relates to the same TFE-containing copolymer of Claim 18. It contains only an amount of extractable cations lower than 1 ppm, but is without citing the process of gel-type purification.

7. Applicant has now claimed in parent **Claim 18** an unexpected way of obtaining thermoprocessable tetrafluoroethylene (TFE) copolymers specifically in the gel form by two process steps: (A) adding an acid electrolyte having pH ≤ 2 to a polymer latex, and (B) washing the polymeric gel. The polymer is produced by polymerization in dispersion or aqueous emulsion of TFE with one or more monomers selected from the following eight choices as: (a) C_{3-8} perfluoroolefins; (b) C_{2-8} hydrogenated fluoroolefins; (c) C_{2-8} chloro- and/or

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iodo-fluoroolefins; (d) (per)fluoroalkylvinylethers (PAVE) $\text{CF}_2=\text{CF}-\text{O}-\text{R}_f$; (e) (per)fluoro-oxyalkylvinylethers $\text{CF}_2=\text{CF}-\text{O}-\text{X}$; (f) fluorodioxoles; (g) non-conjugated dienes of $\text{CF}_2=\text{CF}-\text{O}-\text{CF}_2\text{CF}_2-\text{CF}=\text{CF}_2$ or $\text{CFX}^1=\text{CX}^2-\text{O}-\text{CX}^3\text{CX}^4-\text{O}-\text{CX}^2=\text{CX}^1\text{F}$; and (h) fluorovinylethers (MOVE) having a formula of $\text{CFX}_{\text{Al}}=\text{CX}_{\text{Al}}-\text{O}-\text{CF}_2-\text{O}-\text{R}_{\text{Al}}$; Parent **Claim 33** relates to the same TFE-containing copolymer of Claim 18. It is in the gel form. However, it is without citing the process of gel-type purification.

8. In a very close examination on 102 rejection, **Bloong** only discloses various high purity TFE-containing thermoplastic fluoropolymers and its process of making and purifying so as to reduce the level of the extractable ions in the fluoropolymer to a level of less than 0.05 ppm (abstract, line 1-6; column 1, line 46-52; see various types of TFE-containing fluoropolymers at column 2, line 44-59; particularly see “thermoplastic” on column 2, line 19 and 36 and 44).

The purification of Bloong’s TFE-containing copolymer is **NOT disclosed or suggested using the gel-type purifying process at all**. To be more specific, **Bloong is using a quite different process including first agglomerating and then fluorinating process for purification** (see Applicants’ arguments in pages 11-12 of Remarks). Although Claim 33 does not disclose the gel-type purification by acid electrolyte, the copolymer is still in the gel form and is carrying the same low purities on surfactant and extractable cations. It would necessarily take special condition to achieve such a low level on both limitations. Therefore, Bloong cannot anticipate the limitation of parent claim 18 and Claim 33.

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9. It is noted by this Examiner that the gel-type process is quite different from Bloong's process as known in the art. It would necessarily and always take at least some special condition so as to achieve such a low level on both limitations. Additionally, the property and performance of copolymers obtained from different process may be at least somewhat different. Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

Additionally, the present invention has shown in examples along with some comparative examples for unexpected results in preparing such a copolymer in the gel form (see pages 15-27 for **examples 1-6** along with its comparative control, and **Tables 1-3**). Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US Patent No. 4,675,380 to Buckmaster et al. only discloses a process for the preparation of **"melt-processable" tetrafluoroethylene/perfluoroolefin copolymer granules** (see title), the process comprises adding a gelling agent to the polymer dispersion and a mineral acid such as nitric acid while being agitated, and then **a water-immiscible liquid is added to break the gelled structure** (column 4, line 1-28). After coagulation, the product is separated, washed and dried as routine (see examples). However, Buckmaster fails to teach or fairly

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suggest obtaining the dispersion in the form of gel so as to be washed and agitated with aqueous solution. Additionally, both the amount of extractable cations being lower than 1 ppm as well as the amount of surfactant being lower than 10 ppm are NOT disclosed or suggested.

US Patent No. 4,990,283 to Visca only discloses a process to **prepare micro-emulsions of perfluoropolyether in water medium by a fluorinated surfactant** (abstract, line 1-8).

Although a gel was obtained from PFPE (column 6, line 59), no claimed acid electrolyte of present invention for forming a gel and then washing the gel was disclosed. Additionally, both the amount of extractable cations being lower than 1 ppm as well as the amount of surfactant being lower than 10 ppm are NOT disclosed or suggested. Therefore, Visca fails to teach or fairly suggest the limitation of present invention.

11. The key issue on making a TFE-containing copolymer in the gel form so as to contain the amount of extractable cations being lower than 1 ppm as well as the amount of surfactant being lower than 10 ppm, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the three independent and parent **Claims 18 and 33** are allowed for

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the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claims 19-30** are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu** whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

September 29, 2006